

Scientists possibly unlock biodiversity door

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(PhysOrg.com) -- Looking for the answer to why the tropical Amazonian rainforest has more bird, plant and insect life than Vancouver Island's temperate rainforest has been like looking for a needle in a haystack. That is until now.

Simon Fraser University research associate [paleontologist](#) Bruce Archibald has spent the past decade investigating the question. He and his colleagues may have finally found the answer: it's the difference between summer and [winter temperatures](#).

Climate is obviously different in the tropics, but it's not that simple, says Archibald. "Which particular climatic factor in the tropics might be responsible for high diversity?" ponders Archibald.

"There's not only more heat and light, but also much lower seasonal variation in temperature, where the average temperature of the hottest and coolest month may vary by only a few degrees. These factors tend to change together as you travel away from the equator toward the poles, leaving it difficult to separate their individual effects on diversity."

But Archibald and his colleagues found a way. They began by trapping myriad insects in Costa Rica's hot, low-seasonality jungle and in the cool, high-seasonality Harvard Research Forest in Massachusetts.

Then, to separate the possible effects of heat and light from [seasonality](#), they took the novel approach of adding paleontology to their study.

“We compared samples of modern insects with fossil insects from the 52.9-million-year-old McAbee site near Cache Creek, B.C., which had an average yearly temperature similar to that of southern B.C. today, yet had low seasonality like the modern tropics,” says Archibald. “The amazing preservation of its fossil community makes it a rare spot of international importance and a crucial window into the past, one through which we can see the modern world in a new way that offers answers that might be otherwise difficult to find.”

(Ironically, McAbee site itself is in danger of becoming extinct because it is in the hands of commercial owners who have built a road through it.)

The scientists’ eureka moment came when they found that ancient McAbee had insect diversity at least as high as the modern tropical Costa Rican jungle.

“This indicates that it’s low seasonality, not greater heat and light, that promotes the modern tropics’ high diversity,” explains Archibald.

Their findings also imply a startling idea: that the world may be less diverse now than it was 52.9 million years ago, when low seasonality extended globally into high latitudes. Their research is published this month (July) in the journal *Paleobiology*.

Archibald and his research team may have solved a biodiversity conundrum that has puzzled scientists since the late 1700s when naturalist explorer Alexander von Humboldt discovered the tropics’ amazing [biodiversity](#). Scientists have posed more than 100 hypotheses to explain the conundrum.

Provided by Simon Fraser University

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